federal register

FRIDAY, OCTOBER 12, 1973

WASHINGTON, D.C.

Volume 38 ■ Number 197

PART II

ENVIRONMENTAL PROTECTION AGENCY

■

AMBIENT AIR MONITORING EQUIVALENT AND REFERENCE METHODS

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Parts 50, 51]

AMBIENT AIR MONITORING EQUIVALENT AND REFERENCE METHODS

Notice of Proposed Rulemaking

Notice is hereby given that the Environmental Protection Agency is considering amendments to Parts 50 and 51 of Title 40, Code of Federal Regulations, as set forth below.

Elsewhere in this issue of the FEDERAL REGISTER, EPA is proposing the addition of a new Part 53, entitled "Ambient Air Monitoring Equivalent and Reference Methods," to Title 40 of the Code of Federal Regulations. As more fully described in the Notice of Proposed Rulemaking concerning the proposed new Part 53, that Part would establish definitive requirements and procedures applicable to determinations whether methods of sampling and analyzing the ambient air may be designated "equivalent methods" or "reference methods" for the measurement of specified air pollutants. It is intended that such determinations be governed in the future by the provisions of the proposed Part 53 as finally promulgated. The amendments proposed in this Notice would revise existing provisions pertinent to such determinations and would, in effect, provide that for purposes of Parts 50 and 51 such determinations will be governed in the future by the provisions of Part 53.

Interested persons may submit written comments on the proposed amendments in triplicate to the quality Assurance and Environmental Monitoring Laboratory, United States Environmental Protection Agency, National Environmental Research Center, Research Triangle Park, North Carolina 27711. All relevant comments postmarked not later than 45 days after publication of this notice will be considered. All comments will be available for public inspection during normal business hours at the address specified above.

This notice of proposed rulemaking is issued under the authority of sections 109 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 1857c-4, 1857g(a)).

Dated September 26, 1973.

JOHN QUARLES,
Acting Administrator,
Environmental Protection Agency.

Part 50 of Title 40 of the Code of Federal Regulations is proposed to be amended as follows:

In § 50.1, paragraphs (f) and (g) are revised to read as follows:

§ 50.1 Definitions.

* * * * *

(f) "Reference method" means a method of sampling and analyzing the ambient air for an air pollutant as described in an appendix to this part or a method that has been designated as a reference method in accordance with part 53 of this chapter.

(g) "Equivalent method" means any method of sampling and analyzing the ambient air for an air pollutant that has been designated as an equivalent method in accordance with part 53 of this chapter.

Part 51 of Title 40 of the Code of Federal Regulations is proposed to be amended as follows:

1. In § 51.14, the table in subparagraph (1) of paragraph (e) is revised by revising footnote 1 to read as follows:

§ 51.14 Control Strategy: Carbon monoxide, hydrocarbons, photochemical oxidants, and nitrogen dioxide.

* * * * *

(e) * * *

(1) * * *

1. Other methods of measurement will be considered equivalent methods if they have been designated equivalent methods in accordance with part 53 of this chapter.

2. In § 51.17, the table in subparagraph (1) of paragraph (a) is revised by revoking footnotes d, e, and f, by revoking the table of performance specifications for pollutants sulfur dioxide, carbon monoxide and photochemical oxidant (corrected for NO_2 and SO_2) appearing after the colon in the second sentence of footnote 1, and by revising the second sentenec of footnote 1 to read as follows:

§ 51.17 Air quality surveillance.

(a) (1) * * *

* * * * *

1 * * * Other methods of measurement will be considered equivalent methods if they have been designated equivalent methods in accordance with part 53 of this chapter.

* * * * *

[FR Doc.73-21338 Filed 10-11-73;8:45 am]

[40 CFR Part 53]

AMBIENT AIR MONITORING EQUIVALENT AND REFERENCE METHODS

Notice of Proposed Rulemaking

Notice is hereby given that the Environmental Protection Agency is considering the addition of a new Part 53 to Title 40 of the Code of Federal Regulations, as set forth below. The proposed new Part 53 would establish requirements and procedures applicable to determinations whether, for purposes described more fully below, methods of sampling and analyzing the ambient air may be designated "equivalent methods" or "reference methods" for the measurement of specified air pollutants.

As required by section 109 of the Clean Air Act, as amended December 31, 1970 (Public Law 91-604), the Administrator of the Environmental Protection Agency published on January 30, 1971 (36 FR 1502) and March 30, 1971 ((36 FR 5867)), proposed national primary and secondary ambient air quality standards for six pollutants and, after consideration of comments received, promulgated the same on April 30, 1971, 36 FR 8186. The national ambient air quality standards are now codified at 40 CFR Part 50. In addition to prescribing ambient air quality standards, the Administrator published certain test procedures to be utilized by the Environmental Protection Agency and State and local agencies to measure the levels of ambient air quality for each of the six pollutants. The measurement procedures are described in detail in appendices to Part 50 and are defined in 40 CFR 50.1(f) as "reference methods."

The ambient air quality standards, as prescribed, provide that measurements are to be made by the appropriate reference method or by an "equivalent method." "Equivalent method" is defined in 40 CFR 50.1(g) as "any method of sampling and analyzing for an air pollutant which can be demonstrated to the Administrator's satisfaction to have a consistent relationship to the reference method." 40 CFR 51.17(a)(1), discussed below, contains additional requirements applicable to a determination that a method is an "equivalent method." In addition to the requirement that a consistent relationship to the reference method be shown, a candidate method is required under § 51.17(a)(1) to meet certain performance specifications described in that section.

Within 9 months after promulgation of the National Ambient Air Quality Standards, i.e., no later than January 30, 1972, each State was required by Section 110 of the Act to adopt and submit to the Administrator a plan which provided for the implementation, maintenance, and enforcement of the national ambient air quality standards within each air quality control region (or portion thereof) within the State. The Act requires the Administrator to approve an implementation plan, or any portion thereof, if he determines that the plan (or portion thereof) was adopted after reasonable notice and hearing and that it satisfies detailed criteria set forth in § 110(a)(2)(A)-(H) of the Act. To assist the States in the development of the implementation plans, and to implement the requirements of § 110, EPA proposed and promulgated regulations entitled "Regulations for Preparation, Adoption, and Submittal of Implementation Plans." See 40 CFR Part 51 (36 FR 15486).

The purpose of the proposed new Part 53 is to assist State and local governments and ambient air monitoring instrument manufacturers with respect to one of the requirements applicable to approval of implementation plans. Section 110(a)(2)(C) of the Act provides in part that a plan must include:

* * * provision for establishment and operation of appropriate devices, methods, systems, and procedures necessary to (i) monitor, compile, and analyze data on ambient air quality * * *

This provision has been amplified in the implementation plan guidelines at 40 CFR 51.17, "Air Quality Surveillance." Among other things, § 51.17 requires that plans provide for the establishment of an air quality surveillance system as expeditiously as practicable but not later than two years after the date of plan approval. Each surveillance system must comply with certain minimum requirements, one of which is that each method used by a

State to monitor the ambient air be either the appropriate reference method or a method that is equivalent to the reference method. The proposed new Part 53 would establish definitive requirements and procedures by which States or instrument manufacturers may have their monitoring methods determined to be equivalent methods or reference methods.

As indicated previously, 40 CFR 50.1 (g) and 51.17(a)(1) presently contain provisions pertinent to determinations whether monitoring methods are equivalent methods, and 40 CFR 50.1(f) defines specified methods as reference methods. In addition, equivalent methods are referred to in 40 CFR 51.14(e)(1). It is intended that determinations whether candidate methods are equivalent methods or reference methods be governed in the future by the provisions of Part 53 as finally promulgated. Accordingly, EPA is proposing elsewhere in this issue of the FEDERAL REGISTER appropriate amendments to 40 CFR 50.1(f), 50.1(g), 51.14 (e)(1), and 51.17(a)(1).

It is recognized that some State or local governments may have purchased monitoring instruments or systems that purport to be reference methods or equivalent methods (or elements thereof) in accordance with the existing provisions of 40 CFR 50.1(f), 50.1(g), and 51.17(a)(1) but which will not conform to the requirements of Part 53 if it is promulgated as proposed. Because purchase of such equipment may have been relatively costly, EPA is considering allowing its use on some basis for purposes of 40 CFR 51.17(a)(1), provided that the equipment was purchased prior to publication of this notice in the FEDERAL REGISTER. For example, use of such equipment might be permitted, on a showing satisfactory to the Administrator that the equipment meets the pertinent existing requirements of 40 CFR 50.1(f), 50.1(g), and 51.17(a)(1), for a period that would allow a reasonable time for replacement of the equipment with new equipment satisfying the requirements of Part 53 as finally promulgated. State and local governments and other interested parties are specifically invited to comment on this proposal, to suggest other courses of action that EPA might follow in this regard, and to submit any information that they consider pertinent to the proposal or to alternative courses of action. In particular, State or local governments that have purchased instruments or systems purporting to be reference methods or equivalent methods (or elements thereof) in accordance with 40 CFR 50.1 (f), 50.1(g), and 51.17(a)(1) are invited to comment on the number, type, and cost of the instruments or systems they have purchased, the possibility that such equipment might conform to the requirements of the proposed Part 53 if it is promulgated as proposed, and the possibility that nonconforming equipment might be replaced with conforming equipment in time to permit compliance with 40 CFR 51.17(a)(1) within the time specified in that section.

The proposed new Part 53 is divided into three subparts, the contents of which may be summarized as follows.

Subpart A contains the general requirements to be satisfied for an equivalent or reference method determination for both automated and manual methods. It specifies the descriptive information and affidavits that must be submitted whenever such a determination is requested. The primary responsibility for an equivalent or reference method determination rests with the applicant. Candidate automated methods that purport to measure sulfur dioxide, carbon monoxide, or photochemical oxidants must satisfy the performance specifications described in Subpart B and demonstrate a consistent relationship as required by Subpart C. Candidate manual methods need only demonstrate a consistent relationship as required by Subpart C.

Subpart A also provides that any method determined to be an equivalent or reference method will be officially designated as such in the FEDERAL REGISTER. Any applicant whose method is rejected may appeal the rejection by requesting reconsideration. Designations of methods may be cancelled if the methods are subsequently found not to be in compliance with the provisions of Part 53. Prior to cancellation, the manufacturer of the method in question will receive written notice of the facts that the Administrator believes warrant cancellation and an opportunity to demonstrate or come into compliance. In addition, a hearing may be granted. The above procedures will assist the Agency in obtaining reliable data and in making fair and sound judgments when granting, rejecting, or canceling a method.

Subpart B of the proposed Part 53 specifies performance characteristics that must be met by automated methods with respect to interference, lower detectable limit, precision, rise time, fall time, zero drift, span drift, lag time, and noise.

Subpart C contains the general provisions and test procedures necessary for demonstrating a consistent relationship between candidate methods, whether automated or manual, and reference methods.

EPA recognizes that for carbon monoxide, and photochemical oxidants, each reference method designated in 40 CFR Part 50 is a combination of a reference principle and a calibration procedure and not a single specific method. Therefore, it is possible for various instrument manufacturers to construct different air monitoring equipment based on different adaptations of the same reference measurement principle. If an applicant's candidate automated method utilizes the appropriate reference principle and calibration procedures correctly and his instrument satisfies all the performance characteristics of Subpart B, his method may be determined to be a reference method.

It is the intent of EPA to encourage the advancement of the art of monitoring pollutants in ambient air. If the Administrator becomes convinced that a candidate method has the necessary measurment capability and is superior to the existing reference method, he will consider naming it the reference method. In this manner, EPA intends to keep the best available analytical methodology as the reference method.

Interested persons may submit written comments on the proposed regulations in triplicate to the Quality Assurance and Environmental Monitoring Laboratory, United States Environmental Protection Agency, National Environmental Research Center, Research Triangle Park, North Carolina 27711. All relevant comments postmarked not later than 45 days after publication of this notice will be considered. All comments will be available for public inspection during normal business hours at the address specified above. The regulations, modified as the Administrator deems appropriate after consideration of comments, will be effective on October 12, 1973.

This notice of proposed rulemaking is issued under the authority of section 301(a) of the Clean Air Act, as amended (42 U.S.C. § 1857g(a)).

Dated September 26, 1973.

JOHN QUARLES,
Acting Administrator,
Environmental Protection Agency.

A new Part 53 is added to Chapter I, Title 40, Code of Federal Regulations, as follows:

PART 53—AMBIENT AIR MONITORING EQUIVALENT AND REFERENCE METHODS

Subpart A—General Provisions

Sec.
53.1 Definitions.
53.2 Applicability.
53.3 Request for equivalent or reference method determinations.
53.4 General requirements for an equivalent method determination.
53.5 General requirements for a reference method determination.
53.6 Procedures for equivalent and reference method determinations.
53.7 Right of entry; tests and inspections.
53.8 Publication of equivalent and reference methods.
53.9 Appeal.
53.10 Cancellation of an equivalent or reference method determination.
53.11 Hearings on cancellation.
53.12 Modification of an equivalent method.
53.13 Modification of a reference method.
53.14 Trade secrets and confidential and privileged information.

Subpart B—Test Procedures for Measuring Performance Characteristics

Sec.
53.20 General provisions.
53.21 Test procedures for automated methods.
53.22 Procedures for measuring performance specifications.

Subpart C—Test Procedures for Demonstrating a Consistent Relationship Between Candidate Methods and Reference Methods

Sec.
53.30 General provisions.
53.31 Test procedure for oxidant methods.

Sec.
53.32 Test procedure for carbon monoxide methods.
53.33 Test procedure for sulfur dioxide methods.

AUTHORITY: Sec. 301(a) of the Clean Air Act (42 U.S.C. section 1857g(a)), as amended by sec. 15(c)(2) of Public Law 91-604, 84 Stat. 1713.

Subpart A—General Provisions

§ 53.1 Definitions.

(a) As used in this part, all terms not defined herein shall have the meaning given them by the Act.

(b) "Act" means the Clean Air Act, as amended (42 U.S.C. 1857 *et seq.*).

(c) "Agency" means the Environmental Protection Agency.

(d) "Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

(e) "Reference Method" means any method of sampling and analyzing the ambient air for an air pollutant which has been determined in accordance with this part to be in compliance with the criteria described in the appropriate appendix to Part 50 of this chapter, and has been officially designated as a reference method by publication in the FEDERAL REGISTER.

(f) "Equivalent Method" means any method of sampling and analyzing the ambient air for an air pollutant which has been determined in accordance with this part to meet all the requirements of this part, and has been officially designated as an equivalent method by publication in the FEDERAL REGISTER.

(g) "Candidate Method" means any method of sampling and analyzing the ambient air for an air pollutant submitted to the Administrator for an equivalency determination or a reference method determination.

(h) "Automated Method" means an instrumental technique that automatically samples, analyzes, and provides a record of the concentration of an ambient air pollutant in a single measurement system.

(i) "Manual Method" means a method for measuring concentrations of an ambient air pollutant in which the sample collection and analysis are performed in separate systems.

(j) "Applicant" means any person who submits a candidate method to the Administrator for an equivalent or reference method determination.

(k) "Ultimate Purchaser" means the first person who purchases, for purposes other than resale, an ambient air monitoring method which has been determined by the Administrator to be an equivalent or reference method.

§ 53.2 Applicability.

The provisions of this part apply to any applicant who requests a determination that a candidate method is an equivalent method or a reference method.

§ 53.3 Request for equivalent or reference method determinations.

All data and information required shall be submitted in triplicate to:

Director, Quality Assurance and Environmental Monitoring Laboratory
United States Environmental Protection Agency
National Environmental Research Center
Research Triangle Park, North Carolina 27711

§ 53.4 General requirements for an equivalent method determination.

(a) Automated methods: The requirements for performance specifications (Subpart B) and for consistent relationship (Subpart C) shall be satisfied to establish equivalence of automated methods for monitoring sulfur dioxide, carbon monoxide, and photochemical oxidants.

(b) Manual methods: Candidate methods which are manual methods shall satisfy the requirements for consistent relationship as specified in subpart C.

(c) Test data and information required to be submitted:

(1) Data on appropriate performance specifications as defined in § 53.20(d) (Table B-1) which relate to the pollutants which the candidate method is designed to measure shall be submitted. All data for each performance specification shall be acquired by the procedures described in subpart B.

(2) Data on the simultaneous "side-by-side" determinations of pollutant concentrations by the candidate method and the reference method shall be submitted. The test procedures described in subpart C shall be followed.

(d) Descriptive information and sworn statements to be submitted:

(1) A detailed description of the candidate method including but not limited to measurement principle, manufacturer, name, model number, a listing of the components, and schematic diagrams, shall be submitted.

(2) A detailed description of the quality control program utilized to assure that all measurement systems that are or that will be made available have the same performance characteristics as the candidate method tested shall be submitted.

(3) A comprehensive description defining calibration and operational procedures which the manufacturer prescribes for field use of the candidate method shall be submitted.

(4) A statement that the candidate method described in accordance with paragraph (d)(3) and/or paragraph (e) of this section is representative of the measurement systems tested, shall be submitted.

(5) A statement that the candidate method has been tested in accordance with the procedures described in subpart B and/or subpart C, as applicable, shall be submitted.

(e) Operation manual: A manual which fully describes how a candidate method and the instruments utilized as part of that method should be operated, shall be submitted. This manual may be utilized to satisfy the requirements of paragraphs (d) (1) and (3) of this section. Any manual which does not provide the information and data required by paragraphs (d) (1) and (3) of this section shall be supplemented as necessary. Candidate methods determined to be equivalent methods shall be accompanied by such manual when delivered to the ultimate purchaser.

(f) Durability of automated methods:

(1) Approved automated methods shall function within the limits of the performance specifications listed at § 53.20 (d) for at least one year after installation in the field, when properly maintained and operated.

(2) If the Administrator determines that a representative sample of a manufacturer's approved automated method fails to perform as required by paragraph (f)(1) of this section, such manufacturer's equivalency determination shall be cancelled in accordance with § 53.10 of this part.

§ 53.5 General requirements for a reference method determination.

(a) Utilization of the reference principle and calibration procedures: All candidate methods submitted for a reference method determination shall utilize the appropriate reference principle and calibration procedures as described in the appendices to part 50 of this chapter.

(b) Automated methods: All candidate automated methods shall comply with the requirements of subpart B of this part.

(c) Descriptive information and sworn statements to be submitted:

(1) A detailed description of the candidate method including measurement principle, manufacturer, name, model number and other forms of identification, including but not limited to a listing of the components and schematic diagrams, shall be submitted.

(2) A detailed description of the quality control program utilized to assure that all measurement systems that are or will be made available have the same performance characteristics as the candidate method tested, shall be submitted.

(3) A comprehensive description defining the calibration and testing procedures which have been followed for the candidate method, shall be submitted.

(4) A statement that the candidate method described in accordance with paragraph (c)(1) of this section is representative of the measurement system tested, shall be submitted.

(5) A statement that the candidate method has been tested in accordance with the procedures described in subpart B of these regulations and Part 50 of this chapter, shall be submitted.

(d) Operation manual. A manual which describes how a candidate method and the instruments utilized as part of that method should be operated shall be submitted. This manual may be utilized to satisfy the requirements of paragraphs (c) (1) and (3) of this section. Any manual which does not provide the information and data required by paragraphs (c) (1) and (3) shall be supplemented as necessary. Candidate methods determined to be reference methods shall be accompanied by such manual when delivered to the ultimate purchaser.

(e) Durability of automated reference methods:

(1) Approved automated methods shall function within the limits of the

performance specifications listed at § 53.20(d) for at least one year after installation in the field, when properly maintained and operated.

(2) If the Administrator determines that a representative sample of a manufacturer's approved automated method fails to perform as required by paragraph (e)(1) of this section, such manufacturer's reference method determination shall be canceled in accordance with § 53.10.

§ 53.6 Procedures for equivalent and reference method determinations.

Upon receipt of the data and information specified in this part, the Administrator will review the submission and, within 60 calendar days, take one or more of the following actions:

(a) Notify the applicant that his method has been determined to be an equivalent or reference method;

(b) Notify the applicant that his request for an equivalent or reference method determination has been rejected, including a statement of reasons for rejection;

(c) Notify the applicant that his submission is incomplete and request the additional information that is needed (incomplete submissions will not start the 60-day period that will be utilized by the Administrator to determine if the candidate method is an equivalent or reference method);

(d) Notify the applicant that additional tests will be conducted by the Administrator, specifying the reasons for the additional tests (the 60-day period will commence one calendar day after the additional tests have been completed).

§ 53.7 Right of entry; tests and inspections.

Any request for an equivalent or reference method determination shall constitute consent for the Administrator or his authorized representative, upon presentation of appropriate credentials, to enter at reasonable times any premises used to construct, modify, operate or test the applicant's instrument(s) for which an equivalent or reference method determination is sought, for the purpose of making inspections and conducting tests to assist in making equivalent or reference method determinations, and to determine compliance with this part.

§ 53.8 Publication of equivalent and reference methods.

Candidate methods which satisfy the criteria of this part will be designated as equivalent or reference methods and such designation will be published in the FEDERAL REGISTER not later than 60 days after the completed submission, or if additional tests have been conducted pursuant to § 53.6(d), 60 calendar days after the completion of such tests.

§ 53.9 Appeal.

Any applicant whose request for an equivalent or reference method determination has been rejected, may appeal the Administrator's decision as follows: (a) The applicant may submit another request for the appropriate determination, (b) the applicant may request the Administrator to reconsider the data and information already submitted, (c) the applicant may request that the Administrator repeat any test which he conducted that was a material factor in his decision to reject the method. A representative of the manufacturer may be present during the performance of any such retest.

§ 53.10 Cancellation of an equivalent or reference method determination.

If the Administrator makes a preliminary finding on the basis of evidence and data available to him that a representative sample of a method designated as an equivalent or reference method does not fully satisfy the requirements of this part, he shall cancel his determination for that method in accordance with the following procedures.

(a) *Notification and opportunity to make necessary adjustments.* (1) The manufacturer shall be notified in writing of the evidence and data which the Administrator has found to warrant cancellation.

(2) Within 60 days following receipt of notification, the manufacturer shall demonstrate to the Administrator's satisfaction that the method in question satisfies the requirements of this part or commence making the adjustments necessary to bring the method into compliance. If adjustments are required, all instruments (methods) needing the adjustments shall be adjusted within a reasonable time, as determined by the Administrator.

(b) *Request for a hearing.* Within 60 days following receipt of the notification, the manufacturer may request a hearing on the Administrator's preliminary finding. The request shall be in writing, signed by an authorized representative of the manufacturer, and shall include a statement specifying the manufacturer's objections to the Administrator's finding, and data in support of such objectons. If, after a review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 53.11 with respect to such issue.

(c) *Publication of cancellation.* If, at the end of the 60-day period the Administrator determines that the approval of the method should be canceled, he shall publish a notice of cancellation in the FEDERAL REGISTER. If a hearing has been requested and granted in accordance with § 53.10, a cancellation notice will not be published until the hearing proceedings have been completed including any administrative review and unless the Agency's determination to cancel has been sustained by the Administrator.

§ 53.11 Hearings on cancellation.

(a)(1) After granting a request for hearing under § 53.10, the Administrator will designate a presiding officer for the hearing.

(2) The General Counsel or his representative will represent the Environmental Protection Agency in any hearing under this section.

(3) If a time and place for the hearing have not been fixed by the Administrator pursuant to § 53.10, the hearing shall be held as soon as practicable at a time and place fixed by the Administrator or by the presiding officer.

(b)(1) Upon his appointment pursuant to paragraph (a) of this section, the Presiding Officer will establish a hearing file. The file shall consist of the notice issued by the Administrator under § 53.10, together with any accompanying material, the request for a hearing and the supporting data submitted therewith and correspondence and other material data relevant to the hearing.

(2) The hearing file will be available for inspection by the manufatcurer or its representative at the office of the Presiding Officer.

(c) The manufacturer of the method in question may be represented by counsel or by any other duly authorized representative.

(d)(1) The Presiding Officer upon the request of any party, or in his discretion, may arrange for a prehearing conference at a time and place specified by him to consider the following:

(i) Simplification of the issues;

(ii) Stipulations, admissions of fact, and the introduction of documents;

(iii) Limitation of the number of expert witnesses;

(iv) Possibility of agreement disposing of all or any of the issues in dispute;

(v) Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

(2) The results of the conference shall be reduced to writing by the Presiding Officer and made part of the record.

(e)(1) Hearings shall be conducted by the Presiding Officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to exclusion by the Presiding Officer of irrelevant, immaterial, or repetitious evidence.

(2) Witnesses shall be placed under oath.

(3) Any witness may be examined or cross-examined by the Presiding Officer, the parties or their representatives. The Presiding Officer may, in his discretion, limit cross-examination to relevant and material issues.

(4) Hearings shall be reported verbatim. Copies of transcripts of proceedings may be purchased by the manufacturer from the reporter.

(5) All written statements, charts, tabulations, and data offered in evidence at the hearing shall, upon a showing satisfactory to the Presiding Officer of their authenticity, relevancy, and materiality, be received in evidence and shall constitute part of the record.

(6) Oral argument shall be permitted. The Presiding Officer may limit oral presentations to relevant and material

issues and designate the amount of time allowed for oral argument.

(f) (1) The Presiding Officer shall make an initial decision which shall include written findings and conclusions and the reasons therefor on all the material issues of fact, law, or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made part of the record. The initial decision shall become the decision of the Administrator without further proceedings unless there is an appeal to the Administrator or motion for review by the Administrator within 20 calendar days of the date the initial decision was filed.

(2) On appeal from or review of the initial decision the Administrator shall have all the powers which he would have in making the initial decision including the discretion to require or allow briefs, oral argument, the taking of additional evidence or the remanding to the Presiding Officer for additional proceedings. The decision by the Administrator shall include written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the appeal or considered in the review.

§ 53.12 Modification of an equivalent method.

After a method has been designated equivalent, any modification made to the method, including but not limited to design, construction, and operational and maintenance procedures shall be reported to the Administrator within 15 calendar days of such modification. If the Administrator makes a preliminary finding that, as modified, the method does not satisfy the requirements of this part, he will notify the applicant, within 30 calendar days from date of the report of his intention to cancel the designation in accordance with § 53.10. If the Administrator determines that additional tests are needed to enable him to determine whether to continue the designation in effect, he shall so notify the applicant within 15 calendar days of the report.

§ 53.13 Modification of a reference method.

After a candidate method has been designated a reference method (automated or manual), any modification to the method, including but not limited to, design and construction, and operational and maintenance procedures shall be reported to the Administrator within 15 calendar days of such modification. Any modification of the construction or design of the method shall be cause for cancellation of the Administrator's designation in accordance with § 53.10. Any modification of the operational and maintenance procedures may be cause for cancellation of the Administrator's designation in accordance with § 53.10.

§ 53.14 Trade secrets and confidential and privileged information.

Any information submitted by an applicant for which a claim of trade secrecy and/or confidential and privileged status is made shall be clearly identified. Any information for which such a claim is made will be handled in accordance with the Agency's regulations on Public Information, which appear at Part 2 of this chapter.

Subpart B—Test Procedures for Measuring Performance Characteristics

§ 53.20 General provisions.

(a) Test procedures applicable to candidate methods and reference methods which are automated methods for developing observations on Interference, Lower Detectable Limit, Precision, Rise Time, Fall Time, Zero Drift, Span Drift, Lag Time, and Noise are described in this subpart. Measurement systems must be operated in the range specified in Table B–1 of paragraph (d) of this section during conduct of these tests.

(b) All recorder chart tracings, test data and other documentation obtained for the purpose of these tests shall be identified, dated and signed by the analyst performing the test, and submitted.

(c) Performance specifications are delineated in paragraph (d) of this section. For each performance specification, an initial series of seven tests shall be conducted. The results of these tests shall be interpreted as follows:

(1) If the instrument passes all seven (7) tests for a given performance specification, pass the instrument for that specification.

(2) If the instrument fails three (3) or more of the seven tests for a given performance specification, reject the instrument for that specification.

(3) If the instrument fails one or two of the initial series of seven tests for a given performance specification, conduct a second series of eight tests for that performance specification. If the number of test results failing that performance specification in the combined total of 15 test results is:

(i) One or two, pass the instrument for that specification.

(ii) Three or more, reject the instrument for that specification.

(d) PERFORMANCE SPECIFICATIONS FOR AUTOMATED METHODS: TABLE B–1

	Units [a]	SO_2	O_3	CO
1. Range [b]	P.p.m	0–0.5	0–0.5	0–50
2. Noise	P.p.m	.005	.005	.50
3. Lower detectable limit	P.p.m	.01	.01	1.0
4. Interference equivalent:				
Each interferent	P.p.m	+0.02	+0.02	+1.0
Total interferent	P.p.m	−0.06	−0.06	−1.5
5. Zero drift:				
12 hour [d]	P.p.m	±0.02	±0.02	±1.0
24 hour	P.p.m	±0.02	±0.02	±1.0
6. Span drift	P.p.m	±0.02	±0.02	±1.0
7. Lag time	Min	20	20	10
8. Rise time, 95 percent	Min	15	15	5
9. Fall time, 95 percent	Min	15	15	5
10. Precision:				
20 percent of upper range limit	P.p.m	.02	.02	1.0
80 percent of upper range limit	P.p.m	.03	.02	1.0

[a] To convert from ppm to μg/m3 at 25° C and 760 mm, multiply by M/0.02447 where M is the molecular weight of the gas.

[b] No performance test required. All other performance specifications are tested on instrument operating in the range specified.

[d] Determined by measuring zero air continuously for 12 hours.

§ 53.21 Test procedures for automated methods.

(a) Generation of test atmospheres: Methods to be used for generation of test atmospheres and for verification of the resulting concentrations are given in Table B–2 of this paragraph. The test gas delivery system shall be designed and constructed so as not to alter the test gas composition in any way during the period of the test. The delivery system shall be fabricated from borosilicate glass or FEP Teflon. All diluent air shall be free from contamination. The temperature surrounding the gas generation system shall be controlled within ±2° C. The output of the gas generation system shall be stable to permit valid results of the required test. If a permeation device is employed during generation of the test atmosphere, the permeation device as well as the air passing over the device shall be controlled to ±0.1° C. Samples for verifying test concentrations shall be collected utilizing the same delivery system as close as possible to the sample intake port of the automated method under test. The concentration of each test atmosphere shall be verified by analysis of duplicate samples before and after each series of tests. Schematic drawings and complete procedural details of the test gas generation and delivery system shall be provided.

(b) TEST ATMOSPHERES: TABLE B–2 (REFERENCES LISTED AT END OF TABLE)

Test gas	Generation	Verification
1. Ammonia	Permeation tube system. Similar procedure to that described in reference 4.	Collect samples in bubbler containing 0.1N HCl. Analyze samples by the Phenate method, p. 232, reference 1.
2. Carbon dioxide	Cylinder of zero air containing the concentration of CO_2 specified in Table B–3.	Certified analysis by manufacturer, vendor or independent laboratory.
3. Carbon monoxide	Cylinders of zero air containing the concentrations of CO specified in Table B–3.	Certified analysis by manufacturer, vendor or independent laboratory. Recertification required every 6 months.
4. Ethane	Cylinder * of zero air containing 10 p.p.m. ethane. Dilute with zero air to concentration specified in Table B–3.	Certified analysis by manufacturer, vendor or independent laboratory using flame ionization detector calibrated with methane.
5. Ethylene	Cylinder * of "prepurified" nitrogen containing 20 p.p.m. ethylene. Dilute with zero air to concentration specified in Table B–3.	Certified analysis by manufacturer, vendor or independent laboratory using flame ionization detector calibrated with methane. Recertification is required every 6 months.
6. Hydrogen chloride	Cylinder * of "prepurified" nitrogen containing 100 p.p.m. of gaseous HCl Dilute with zero air to concentration. specified in Table B–3.	Collect samples in bubbler containing distilled water. Analyze samples by the mercuric thiocyanate method, ASTM (D512), p. 29, reference 2.
7. Hydrogen sulfide	Permeation tube system, p. 426, reference 3.	Tentative method of analysis for H_2S content of the atmosphere, p. 426, reference 3.
8. Methane	Cylinder * of zero air containing the concentration of methane specified in Table B–3.	Certified analysis by manufacturer, vendor or independent laboratory using flame ionization detector calibrated with methane. Recertification is required every 6 months.
9. Nitric oxide	Cylinder * of "prepurified" nitrogen containing 100 p.p.m. NO. Dilute with zero air to concentration specified in Table B–3.	Tentative method of analysis for nitric oxide content of the atmosphere, p. 325, reference 3.
10. Nitrogen dioxide	1. Gas phase titration—description available from NERC–RTP. 2. Permeation tube system—procedure similar to that described in reference 4 and modified by NERC–RTP.	1. Reference 4, Appendix D; O_3 is titrated against NO which is equivalent to NO_2 formed. 2. Reference 3, page 329.
11. Ozone	Calibrated ozone generator. Procedure described in reference method for photochemical oxidant, reference 4.	KI method. Procedure described in reference method for photochemical oxidant, reference 4.
12. Sulfur dioxide	Permeation tube system. Procedure described in reference method for SO_2, reference 4.	P-rosaniline method. Procedure described in reference method for SO_2, reference 4.
13. Water	Pass zero air through distilled water at a fixed known temperature between 20° to 30° C such that the air stream becomes saturated. Dilute with zero air to concentration specified in Table B–3.	Measure relative humidity by means of a dew point indicator, calibrated electrolytic or piezoelectric hygrometer or wet/dry bulb thermometer.
14. Xylene	Cylinder * of "prepurified" nitrogen containing 100 p.p.m. xylene. Dilute with zero air to concentration specified in Table B–3.	Certified analysis by manufacturer, vendor or independent laboratory using flame ionization detector calibrated with methane.
15. Zero air	Air having a water content of less than 1,000 p.p.m., hydrocarbon content as methane of less than or equal to 0.1 p.p.m., carbon dioxide content of 350±30 p.p.m. and oxygen content of 21.0±0.5 percent.	Certified analysis by manufacturer, vendor, or independent laboratory using flame ionization detector calibrated with methane and infrared detector calibrated with carbon dioxide and by using appropriate analytical techniques for oxygen and water content.

* Use stainless steel pressure regulator dedicated to the pollutant measured.

Ref. 1—Standard Methods for Examination of Water and Waste Water, 13th Ed., American Public Health Association, 1015 18th Street NW., Washington, D.C.

Ref. 2—1970 Annual Book of ASTM Standards, Part 23, American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pa.

Ref. 3—Methods of Air Sampling and Analysis, Intersociety Committee, 1972, American Public Health Association, 1015 18th Street NW., Washington, D.C.

Ref. 4—National Primary and Secondary Ambient Air Quality Standards, 40 CFR 50.

(c) Start-up, calibration, and safety requirements:

(1) Set-up and start-up of the instrument shall be in strict accordance with the instrument's instruction manual. Connect the output to a suitable strip chart recorder. (NOTE.—This requirement is not intended to limit data acquisition components. Other components may be used along with the recorder during conduct of these tests. It is intended only to facilitate evaluation of data submitted to EPA for the purpose of demonstrating that a candidate method is an equivalent or reference method.) The recorder shall be of the servo, null-balance type having a chart width of 10 inches or greater, response time of 1 second or less, at least 5 percent below zero or zero offset capability, and deadband of less than 0.25 percent of scale. Allow adequate warm-up or stabilization time as indicated in the instruction manual.

(2) Calibration of the instrument shall be as indicated by the instrument's operation manual. A dynamic calibration curve which has at least 7 identifiable points including 0 and 90 percent of scale shall be submitted. If the chart recorder does not have below zero capability, a 5 percent offset zero shall be employed. The calibration curve shall include a plot of pollutant concentration against chart division or percent of scale and against instrument output in terms of volts or millivolts.

(3) Normal instrument operations or failures shall not generate or present any hazards or hazardous conditions to operators or environment or discharge any hazardous or detrimental effluent gas. Instruments shall include safety devices to prevent hazards or damage to the internal components or performance of the instrument.

§ 53.22 Procedures for measuring performance specifications.

(a) *Range*—(1) *Technical definition.* Nominal minimum and maximum concentrations which the system shall be capable of measuring. The nominal range which shall be used during conduct of all tests is specified in units of parts-per-million by volume in Table B–1 of § 53.20 (d). Pollutant concentration at the lower and upper scale limits are specified, as for example: 0 to 1 ppm.

(2) *Test procedure.* No test procedure is required.

(b) *Noise*—(1) *Technical definition.* Spontaneous, short duration deviations in the instrument output about the mean output, which are not caused by input concentration changes. Noise is determined as the standard deviation about the mean and expressed in concentration units given in Table B–1 of § 53.20(d).

(2) *Test procedure.* (i) Allow sufficient time for instrument warm-up and stabilization. Noise is determined using both zero air and a pollutant test gas concentration as indicated below.

(ii) Recheck strip chart recorder to vertify and demonstrate that recorder deadband is less than 0.25 percent of full scale.

(iii) For this test, it is necessary to disconnect the strip chart recorder from the instrument output, and use instead an integrating type Digital Volt Meter (DVM) accurate to three significant figures on the instrument output. The strip chart tracings shall be submitted along with the DVM readings.

(iv) Sample zero air for 60 minutes.

(v) During this 60-minute interval, record twenty-five (25) random DVM readings.

(vi) Calculate the noise from the 25 DVM readings using the following equations.

(vii) If k_1, k_2 * * * k_{25} are the individual DVM readings, the mean is determined by

$$\overline{k}=\frac{\Sigma k_i}{25}$$

Deviations about the mean are,

$$d_i=k_i-\overline{K}$$

and the standard deviation (noise) is,

$$S=\frac{\Sigma(d_i)^2}{24}$$

Convert d_i and S to concentration in ppm by reference to the previously determined calibration curve for the instrument.

(viii) Repeat steps (iv) through (vii) using a pollutant test gas concentration producing an output of 80±5 percent of the specified upper range limit.

(c) *Lower detectable limit*—(1) *Technical definition.* The minimum pollutant concentration which produces a signal of twice the noise level.

(2) *Test procedure.* (i) Allow sufficient time for warm-up and stabilization. Sample zero concentration and allow for stable reading to establish zero baseline.

(ii) Generate and sample a test atmosphere equal to the value for the lower detectable limit given in the performance specifications [Table B–1, § 53.20 (d)].

(iii) Record instrument reading. An instrument reading of at least twice the noise level previously determined at 0 ppm is necessary to satisfy the requirement for lower detectable limit sensitivity.

(d) *Interference equivalent*—(1) *Technical definition.* Positive or negative output caused by a substance other than the one being measured.

(2) *Test procedure.* The candidate instrument shall be tested for all interferents specified in Table B–3 of paragraph (e) of this section for the pollutant of interest. The basis for the test is that each candidate method is challenged with those interfering agents known or suspected to cause interference. An interferent may be either positive or negative, depending on whether the instrument's output is increased or decreased by the presence of the interferent. Interference tests are performed by mixing each interferent with the pollutant concentrations specified in Table B–3 of paragraph (e) of this section and comparing the instrument's output to the output caused by the pollutant alone. Known gas phase reactions that occur between the interferent and the pollutant are designated in Table B–3. In these cases, the interfering response shall be determined in the absence of the pollutant.

(i) Allow sufficient time for warm-up and stabilization.

(ii) For instruments using a prefilter or scrubber based on a chemical reaction to derive part of its specificity, and that requires periodic service or maintenance, the instrument shall be "conditioned" prior to each interference test as follows:

(*a*) Service or perform the indicated maintenance on the scrubber or prefilter as directed in the manual.

(*b*) Before testing for each interferent, allow the instrument to sample through the scrubber a test atmosphere containing the interferent at a concentration equal to the value specified in Table B–3 of paragraph (e) of this section. Sampling shall be at the normal flow rate and shall be performed for 6 continuous hours prior to testing.

(iii) Three test atmospheres shall be generated as follows:

(*a*) Test atmosphere X: Specified pollutant concentration.

(*b*) Test atmosphere Y: Specified interferent concentration.

(*c*) Test atmosphere Z: Zero air interferent concentration.

(iv) Adjust the individual flow rates and the pollutant or interferent generators for the three test atmospheres as follows:

(*a*) The flow rates of test atmospheres Y and Z shall be equal.

(*b*) The concentration of pollutant in test atmosphere X shall be adjusted such that when mixed (diluted) with either test atmosphere Y or Z, the resulting concentration of pollutant shall be as specified in Table B–3 of paragraph (e) of this section.

(*c*) The concentration of interferent in test atmosphere Z shall be adjusted such that when mixed (diluted) with test atmosphere X, the resulting concentration of interferent shall be equal to the value specified in Table B–3 of paragraph (e) of this section.

(v) Mix test atmospheres X and Y by passing the total flow of both through a mixing flask.

(vi) Sample and measure the mixture of test atmospheres X and Y. Allow for a stable reading, and record the reading in concentration units.

(vii) Mix test atmospheres X and Z by passing the total flow of both atmospheres through a mixing flask.

(viii) Sample and measure a mixture of test atmosphere X and Z. Allow for a stable reading, and record the reading in concentration units.

(ix) Calculate the interference as the second reading minus the first reading.

(x) Repeat steps (iii) through (ix), in turn, for each interferent.

(xi) For those interferents which cannot be mixed with the pollutant, as indicated in Table B–3 of paragraph (e) of this section adjust the concentration of the interferent in the test atmosphere to the specified value without being mixed or diluted by any other test atmospheres.

(xii) Sample and measure the interferent test atmosphere and allow for a stable reading.

(xiii) Record this reading, in positive or negative concentration units, as the interference equivalent.

(xiv) The sum of the absolute values of the individual interferences shall not exceed the value given in performance specifications [Table B–1 of § 53.20(d)] for the total interference. (NOTE.—Specifications for total interferent are not intended to indicate allowable measurement inaccuracy at the levels of air quality standards. The allowable interferent response stated in the performance specifications results from challenging the measurement system with maximal concentration of potential interferents. If ambient air contained the combined concentration of challenging agents specified for the purpose of these tests, it is most likely that the concentration of the pollutant of interest as reported by the measurement system would far exceed the air quality standard.)

(e) INTERFERENT TEST CONCENTRATION FOR AUTOMATED METHODS IN PARTS PER MILLION *: TABLE B–3

Pollutant	Measuring principle	Hydrochloric acid	Ammonia	Hydrogen sulfide	Sulfur dioxide	Nitrogen dioxide	Nitric oxide	Carbon dioxide	Ethylene	Ozone	m-Xylene	Water vapor	Carbon monoxide	Methane	Ethane
SO_2	Flame photometric-(FPD).	----	----	0.1	•0.14	----	----	750	----	----	----	ᵇ25,000	50	----	----
SO_2	Gas chromatography-(FPD).	----	----	0.1	•0.14	----	----	750	----	----	----	ᵇ25,000	50	----	----
SO_2	Spectrophotometric-wet chemical (pararosaniline reaction).	0.2	ᵇ0.1	0.1	•0.14	0.5	----	750	----	0.5	----	----	----	----	----
SO_2	Electrochemical	0.2	ᵇ0.1	0.1	•0.14	0.5	0.5	----	0.2	0.5	----	ᵇ25,000	----	----	----
SO_2	Conductivity	0.2	ᵇ0.1	----	•0.14	0.5	----	750	----	----	----	----	----	----	----
SO_2	Spectrophotometric-gas phase.	----	----	----	•0.14	0.5	0.5	----	----	0.5	0.2	----	----	----	----
O_3	Chemiluminescent (other than ref. method).	----	----	ᵇ0.1	----	----	----	750	----	•0.08	----	ᵇ25,000	----	----	----
O_3	Electrochemical	----	ᵇ0.1	----	0.5	0.5	----	----	----	•0.08	----	ᵇ25,000	----	----	----
O_3	Spectrophotometric-wet chemical (potassium iodide reaction).	----	ᵇ0.1	----	0.5	0.5	ᵇ0.5	----	----	•0.08	----	----	----	----	----
O_3	Spectrophotometric-gas phase.	----	----	----	0.5	0.5	ᵇ0.5	----	----	•0.08	----	----	----	----	----
NO_2	Chemiluminescent	----	ᵇ0.1	----	0.5	•0.1	0.5	----	----	----	----	ᵇ25,000	----	----	----
NO_2	Spectrophotometric-wet chemical (azo-dye reaction).	----	----	----	0.5	•0.1	0.5	----	----	0.5	----	----	----	----	----
NO_2	Electrochemical	----	----	----	0.5	•0.1	0.5	----	----	0.5	----	ᵇ25,000	50	----	----
NO_2	Spectrophotometric-gas phase.	----	----	----	0.5	•0.1	0.5	----	----	----	0.2	----	----	----	----

Pollutant	Measuring principle	Hydrochloric acid	Ammonia	Hydrogen sulfide	Sulfur dioxide	Nitrogen dioxide	Nitric oxide	Carbon dioxide	Ethylene	Ozone	m-Xylene	Water vapor	Carbon monoxide	Methane	Ethane
CO	IR (other than reference method).							750				25,000	• 10		
CO	Gas chromatography-FID.											25,000	• 10		0.5
CO	Electrochemical						0.5		0.2			25,000	• 10		
CO	Catalytic combustion-thermal detection.		0.1					750	0.2			25,000	• 10	5.0	0.5
CO	IR fluorescence							750				25,000	• 10		0.5
CO	Mercury replacement-UV photometric.								0.2				• 10		0.5
THC/CH_4	Catalytic combustion-FID.								0.2			25,000	50	• 2.0	0.5

• Concentrations of interferent listed must be prepared to ± 20 percent of stated value and controlled to ± 10 percent.
[b] Do not mix with pollutant.
• Concentration of pollutant used for test. These pollutant concentrations must be prepared to ± 10 percent of stated value and controlled to ± 5 percent.

(f) Test procedures for zero drift, span drift, precision, rise time, fall time, lag time:

(1) Determination of these response elements shall be accomplished over a period of at least seven days. During the test, manual adjustments to the electronics, gas or reagent flows shall be permitted only once every three days. Automatic adjustments which are a part of the normal instrument operations are permitted at any time. A sampling plan is given in Table B–4 of paragraph (g) of this section.

(2) Technical definition of zero drift: The change in instrument output over a stated time period of unadjusted continuous operation, when the input concentration of pollutant is zero.

(3) Technical definition of span drift: The change in instrument output over a stated time period of unadjusted continuous operation, when the input pollutant concentration is a stated upscale value.

(4) Test procedure for zero and span drift:

(i) Allow sufficient time for instrument to warm up and stabilize.

(ii) Sample zero air until a stable reading is obtained, and adjust baseline to 5 percent of chart. Instrument is operated at normal line voltage and normal room temperature (normal temperature range is between 20–30° C; normal line voltage range is between 105–125 volts).

(iii) Sample test atmosphere of pollutant concentration equal to 80±5 percent of the upper range limit. Adjust span control as necessary.

(iv) Sample test atmosphere of pollutant concentration equal to 20±5 percent of the upper range limit and record the output.

(v) Hereafter, no manual adjustments shall be made to the instrument, except as indicated in the test plan, and then only *after* the zero and span readings have been recorded for that day. Allow the instrument to sample ambient air or perform other tests during idle periods.

(vi) Sample test atmosphere of pollutant concentrations of 0, 20, and 80 percent of the upper range limit each day, 24 hours after the previous day's readings. These test concentrations shall be consistent from day to day. Allow sufficient time for stabilization of zero and span output and record the readings in concentration units. Subtract each day's readings from the previous day's respective readings to obtain the zero and span drift for that day.

(vii) Sample and measure zero air continuously for at least 12 hours each day. Determine the minimum and maximum readings during this period of 12 consecutive hours and record the "peak-to-peak" difference, regardless of sign in concentration units, as the 12-hour drift.

(viii) At the beginning of the next 12-hour continuous zero air test, change the line voltage and room temperature to the value given in test plan.

(ix) On the 4th, 7th, 10th, and 13th days as indicated in the test plan, the instrument may be serviced and adjusted after the readings are obtained.

(x) On the 8th day, the test results shall be examined to determine if further testing is required.

(xi) This test shall be conducted either in an uninterrupted period of seven or fifteen days, or periods of three consecutive days during which no adjustments shall be permitted. For example, if the test is interrupted by weekends, it may be performed in three-day periods where adjustments are made on Monday and readings are taken on Tuesday, Wednesday, and Thursday.

(5) Lag time:

(i) Technical definition: The time interval between a step change in input concentration at the instrument inlet to the first observable corresponding change in instrument output.

(ii) Test procedure:

(*a*) Sample zero air until a stable reading is obtained.

(*b*) Switch to the test atmosphere used in paragraph (f)(4)(iv) while simultaneously starting a stopwatch.

(*c*) Observe the instrument output and stop the stopwatch immediately when the first observable change occurs due to the step concentration change in the output.

(*d*) Record the elapsed time.

(6) Rise time:

(i) Technical definition: The time interval between initial response and 95 percent of final response after a step increase in input concentration.

(ii) Test procedure:

(*a*) Sample zero air until stable reading is obtained.

(*b*) Sample a concentration of 80±5 percent of the upper range limit, and obtain a stable reading.

(*c*) Calculate 95 percent of the reading obtained in paragraph (f)(6)(ii)(b) of this section.

(*d*) Repeat paragraph (f)(6)(ii)(a) of this section.

(*e*) Sample the same concentration as in paragraph (*b*) and use a stopwatch to time the interval starting with the first observable instrument output response, and ending when the response equals the reading calculated in paragraph (f)(6)(ii)(c) of this section.

(*f*) Record the elapsed time.

(7) Fall time:

(i) Technical definition: The time interval between initial response and 95 percent of final response after a step decrease in input concentration.

(ii) Test procedure:

(*a*) Sample a concentration of 80±5 percent of the upper range limit, and obtain a stable reading.

(*b*) Sample zero air and use a stopwatch to time the interval starting with the first observable instrument output response, due to the step change and ending when the response equals 5 percent of the upper range limit, corrected for zero baseline drift based on the zero reading obtained in § 53.22(f)(6) (Rise Time), step (ii)(*a*).

(*c*) Record the elapsed time.

(*d*) Repeat steps (*a*), (*b*), and (*c*).

(8) Precision:

(i) Technical definition: Variation about the mean of repeated measurements of the same concentration. This variation is expressed as one standard deviation about a mean.

(ii) Test procedure:

(*a*) Allow sufficient time for instrument warm-up and stabilization.

(*b*) Sample and measure zero air until a stable reading is obtained. Do not record.

(*c*) Sample a pollutant concentration of 20±5 percent of the upper range limit and obtain a stable reading. Convert to concentration units and record value.

(*d*) Sample a pollutant concentration at least 50 percent higher (30 percent

of full scale) than in (c) above until a stable reading is obtained. Do not record.

(e) Quickly switch to the pollutant concentration used in (c). Record the reading.

(f) Repeat steps (b) through (e) two additional times.

(g) Calculate and report the mean and standard deviation for these six values.

(h) Repeat step (b).

(i) Sample a pollutant concentration of 80±5 percent of the upper range limit and obtain a stable reading. Convert to concentration units and record value.

(j) Sample a pollutant concentration 20 percent higher than in paragraph (f)(8)(i) of this section. But not to exceed 97 percent of full scale.

(k) Quickly switch to the pollutant concentration used in (j). Record the reading.

(l) Repeat steps (i) through (k) two additional times.

(m) Calculate and report the mean and standard deviation for these six values.

(g) ZERO AND SPAN DRIFT TEST PLAN [a]: TABLE B-4

Day	Morning	Line voltage	Room temperature, °C.	Afternoon	Night (12 hrs. minimum)
1	Adjust zero and span	125	20	Other tests not requiring adjustments to the instrument may be performed. See test procedures for rise time, fall time, lag time, and precision.[a]	Adjust line voltage and room temperature to values given at right [c], [d]. Sample zero air continuously.
2	Sample and read 0, span 1 and span 2.	105	20		
3	Sample and read 0, span 1 and span 2.	125	30		
4	Sample and read 0, span 1 and span 2; adjustments may be made to the instrument, if necessary, after readings are taken.	105	30		
5	Sample and read 0, span 1 and span 2.	125	20		
6	Sample and read 0, span 1 and span 2.	105	20		
7	Sample and read 0, span 1 and span 2; instrument adjustments permitted after readings are taken.	125	30		
8	Sample and read 0, span 1 and span 2[b].	105	30		
9	Sample and read 0, span 1 and span 2.	125	20		
10	Sample and read 0, span 1, span 2; adjustments permitted after readings are taken.	105	20		
11	Sample and read 0, span 1 and span 2.	125	30		
12	Sample and read 0, span 1 and span 2.	105	30		
13	Sample and read 0, span 1, span 2; adjustments permitted after readings are taken.	125	20		
14	Sample and read 0, span 1 and span 2.	105	20		
15	Sample and read 0, span 1 and span 2.	125	30		
16	End of test				

[a] These tests shall be run only once each day. Tests shall also be run either on consecutive days with adjustment permitted every three days or in increments of three consecutive days during which adjustments to the instrumen are not permitted.
[b] At this time examine test results to determine if further tests are required.
[c] Voltage specified shall be controlled to ± 1 volt.
[d] Temperature specified shall be controlled to ±1° C.

Subpart C—Test Procedures for Demonstrating a Consistent Relationship Between Candidate Methods and Reference Methods

§ 53.30 General provisions.

(a) *Selection of test sites.* The exact location of the sampling sites is left to the discretion of the manufacturer; the sampling sites shall be located in areas of expectant maximum pollutant concentrations. It is expected that reference and equivalent methods are applicable to all ambient air environments which are likely to be encountered. The Administrator retains the discretion to select sampling sites for tests he determines necessary to conduct.

(b) *Test atmosphere.* Unaltered ambient air shall be used for the test. However, when necessary the ambient air may be spiked using a pollutant generator. The ambient air sample shall not be altered in any way except by spiking to bring the pollutant level up to specified test concentrations and/or by addition of potential interfering substances normally found in ambient air. The intake and distribution manifold shall be designed so as not to remove particles or trace gases and insure that identical samples reach the reference and candidate sampling instruments. When spiking is used, at least 60 percent of the sample admitted to the instrument shall be ambient air and the remainder can originate from the pollutant generator. Schematic drawings and complete procedural details of the test system shall be provided.

(c) *Simultaneous sampling.* The party shall conduct simultaneous sampling of the test atmosphere by both the reference and candidate methods. All recorder chart tracings and other documentation resulting from conduct of tests shall be identified and submitted along with test data.

(d) *Operation of measurement systems.* Measurement systems shall be operated in the range specified at § 53.20 (d) (Table B-1).

(e) *Demonstration of consistent relationship.* A consistent relationship is demonstrated when the difference in results between candidate method and reference method meet the tolerance values specified in this subpart.

§ 53.31 Test procedure for oxidant methods.

(a) Calibration:

(1) Calibrate the reference instrumental method prior to conducting the tests in accordance with procedures specified in the appropriate appendix to 40 CFR Part 50.

(2) Calibration of the candidate instrument shall be done in accordance with a method specified by the manufacturer.

(3) Calibration data, procedures, and calculations for both the reference and candidate methods shall be submitted.

NOTE.—Calibrations shall be permitted only once every 72 hours (operational period) for both methods. Manual adjustment to the instruments shall not be permissible during the stated operational period. Control samples shall be introduced to both the reference and candidate instruments or operational checks shall be performed during an operational period.

(4) Both the reference and candidate instruments shall be operated continuously during an operational period.

(b) Ambient air tests:

(1) Tests over 1-hour averaging times shall be conducted at three ambient air or spiked ambient air oxidant concentration ranges: 0.06–1.1 ppm, 0.15–0.25 ppm, and 0.35–0.45 ppm. Hourly average oxidant concentration as measured by the reference method shall fall within the range specified. The hourly average shall be based upon integration of the output signal over the entire hourly span.

(2) Description of the methods used to obtain hourly averages shall be submitted.

(3) The following tests shall be performed. Table C-1 of § 53.31 paragraph (c) delineates the number of measurements needed for each of the concentration ranges and their respective tolerances. It indicates that the total sample size for the first sample set is 14 and the allowable number of times that specifications can be exceeded is 0. Similarly, the size of the second sample set, if required, is 18 and the allowable number of times that specifications can be exceeded for the combined total of both samples (32) is 2.

(c) TEST SPECIFICATIONS FOR OXIDANT AND CARBON MONOXIDE: TABLE C–1

Pollutant range (p.p.m.)	Tolerance, i.e. allowance differences between Cand. and Ref. methods (p.p.m.)	Sample size 1st Sample	Sample size 2d Sample
Oxidant:			
1. Low 0.06–0.10	≤0.02	5	6
2. Med. 0.15–0.25	≤0.03	5	6
3. High 0.035–0.45	≤0.04	4	6
Totals		14	18
Carbon monoxide:			
1. Low 7–11	≤1.5	5	6
2. Med. 20–30	≤2.0	5	6
3. High 35–45	≤3.0	4	6
Totals		14	18

Allowable number of differences which can exceed tolerance specifications for each pollutant.

(d) Sampling procedure: Data shall be collected according to a stratified sampling plan. Sampling shall be conducted in sets of three ranges. Within each set sampling without replacement shall occur. For example, if the first range selected is low, then the next one is either medium or high. Once the second range is selected, the third one is automatically determined. In the above example the first one is low, if the second is high, then the third must be medium. This completes the first set of three. In starting the second set of three, the fourth range cannot be the same as the third. So if the third range was medium, then the fourth shall be either low or high. This begins the second set of three ranges. If the fourth range was high, then the fifth can be either medium or low. Thus, once the fifth range has been selected, the sixth range is determined. This procedure is followed to obtain a sample size of 14 for the first sample and a sample size of 18 for the second sample, if needed. As an additional constraint on the sampling plan, at least 3 and no more than 6 samples per day shall be collected in each of three successive days. A sampling plan is specified in § 53.31(e) (Table C–2). Table C–2 shall be used to select either plan 1, 2, or 3 for a sample size of 14 and if an additional sample of 18 is required, then either plan 4, 5, or 6 shall be used.

(e) SAMPLING PLANS FOR POLLUTANT TEST SPECIFICATIONS: TABLE C–2

For sample size of 14	Time requirement falls between 5 and 10 days
Plan No. 1	HLM, LMH, MHL, MLH, LH.
Plan No. 2	LMH, LHM, LHM, HML, HL.
Plan No. 3	MHL, MHL, HML, MHL, HL.

For sample size of 18	Time requirement falls between 7 and 13 days
Plan No. 4	LMH, MHL, HML, MLH, LMH, MHL.
Plan No. 5	LHM, HML, MHL, MHL, MHL, MHL.
Plan No. 6	LMH, LHM, HLM, LMH, MLH, LHM.

NOTE: L=Low concentration range, M=Medium concentration range, H=High concentration range as specified in Table C–1 of § 53.31(b) (3).

(f) Acceptance sampling plan necessary to perform the statistical tests:

(1) The first sample set shall consist of an initial set of 14 measurements. The results of these measurements shall be interpreted as follows:

(i) If the number of measurements from the series of 14 which fail the stated specification does not exceed zero, pass the instrument for consistent relationship.

(ii) If the number of measurements from the series of 14 which fail the stated specification is three or more, reject the instrument for consistent relationship.

(2) If 12 or 13 of measurements from the series of 14 pass the stated specification conduct a second set of 18 test measurements. If the number of measurements failing the consistent relationship test in the combined total of 32 test measurements is:

(i) One or two, pass the instrument for consistent relationship.

(ii) Three or more, reject the instrument for consistent relationship.

§ 53.32 Test procedure for carbon monoxide methods.

(a) Calibration:

(1) Calibrate the reference instrumental method prior to conducting the tests in accordance with procedures specified in the appropriate appendix to 49 CFR part 50.

(2) The candidate instrument shall be calibrated in accordance with the method specified by the manufacturer.

(3) The calibration data, procedures, and calculations for both the reference and candidate methods shall be submitted.

NOTE.—Calibrations shall be permitted only once every 72 hours (operational period) for both methods. Manual adjustments to the instruments shall not be permissible during the stated operational period. Zero and span tests shall be conducted on both the reference and candidate instruments to document that instruments are operating within performance specifications.

(4) Both the reference and candidate instruments shall be operated continuously during an operational period.

(b) Ambient air tests:

(1) Tests over 1-hour averaging times shall be conducted at three ambient air or spiked ambient air carbon monoxide concentration ranges: 7–11 ppm, 20–30 ppm, and 35–45 ppm. Hourly average CO concentration as measured by the reference method shall fall within the range specified. The hourly average shall be based upon continuous integration of the output signal over the entire hourly span, or shall be the average of at least 12 instantaneous signal levels which are at equally spaced intervals over the entire hourly span.

(2) Description of the method used to obtain hourly averages shall be submitted.

(3) The following tests shall be performed. § 53.31(c) delineates the number of measurements needed for each of the concentration ranges and their respective tolerances. It indicates that the total sample size for the first sample is 14 and the allowable number of times specifications that can be exceeded is 0. Similarly, the second sample, if required, is 18 and the allowable number of times specifications can be exceeded for the combined total of both samples (32) is 2.

(c) Sampling procedure:

(1) Data shall be collected according to a stratified sampling plan. Sampling shall be conducted in sets of three ranges. Within each set sampling without replacement shall occur. For example, if the first range selected is low, then the next one is either medium or high. Once the second range is selected the third one is automatically determined. In the above example the first one is low, if the second is high, then the third must be medium. This completes the first set of three. In starting the second set of three, the fourth range cannot be the same as the third. So if the third range was medium, then the fourth shall be either low or high. This begins the second set of three ranges. If the fourth range was high, then the fifth can be either medium or low. Thus, once the fifth range has been selected the sixth range is determined. This procedure is followed to obtain a sample size of 14 for the first sample and a sample size of 18 for the second sample, if needed. As an additional constraint on the sampling plan, at least 3 and no more than 6 samples per day shall be collected in each of three successive days. A sampling plan is specified in § 53.31(e) (Table C–2). Table C–2 shall be used to select either plan 1, 2, or 3 for a sample size of 14 and if an additional sample of 18 is required, then either plan 4, 5, or 6 shall be used.

(2) The acceptance sampling plan necessary to perform the statistical tests is specified as follows:

(i) The first sample set shall consist of an initial set of 14 measurements. The results of these measurements shall be interpreted as follows:

(a) If the number of measurements from the 14 which fail the stated specification does not exceed zero, pass the instrument for consistent relationship.

(b) If the number of measurements from the 14 which fail the stated specification is three or more, reject the instrument for consistent relationship.

(ii) If the number of measurements from the 14 which fail the stated specification is either one or two conduct a second set of 18 test measurements. If the number of measurements failing the consistent relationship test in the combined total of 32 test measurements is:

(a) One or two, pass the instrument for consistent relationship.

(b) Three or more, reject the instrument for consistent relationship.

§ 53.33 Test procedure for sulfur dioxide methods.

A manual reference method has been published in 40 CFR Part 50. The party shall demonstrate a consistent relationship between the candidate method and the reference method in accordance with the following procedures.

(a) *Automated methods.*—(1) *Calibration.* (i) Calibrate the reference

method in accordance with the procedure specified in the appropriate appendix to 40 CFR Part 50.

(ii) The candidate automated method shall be calibrated in accordance with the procedure specified by the manufacturer.

(iii) The calibration data for both the reference and candidate methods and the calibration procedure and calculations for the candidate method shall be submitted. NOTE.—Instrument calibration shall be permitted only once every 72 hours (operational period) for the automated method. Manual adjustment to the instrument is not permissible during the stated operational period. Control samples shall be introduced to the candidate instrument or operational checks shall be performed during an operational period to document that the instrument is operating within performance specifications. Control samples shall also be used in the reference method to verify that the method is in calibration and that valid data are being obtained.

(2) *Operation of the instruments.* The candidate instrument shall be operated continuously during the operational period. Simultaneous measurements of pollutant concentrations shall be obtained by means of the reference and candidate methods for the concentration ranges and averaging times specified in § 53.34(b) (Table C–3). On any given day only one 24-hour test result shall be reported for a specified concentration range. In the range 0.40–0.50 ppm, 1-hour and 24-hour measurements shall be obtained concurrently. One-hour average results obtained by the automated method shall be based on continuous integration of the output signal over the 1-hour span or shall be the average of at least 12 instantaneous signal levels which are at equally spaced intervals over the 1-hour span. In like manner, results of 24-hour measurements shall be obtained.

(b) *Test specifications for sulfur dioxide.* (1) The acceptance sampling plan necessary to perform the statistical tests is specified as follows:

(i) The first sample set shall consist of an initial set of 7 measurements. The results of these measurements shall be interpreted as follows:

(*a*) If the number of measurements from the series of 7 which fail the stated specification does not exceed zero, pass the instrument for consistent relationship.

(*b*) If the number of measurements from the series of 7 which fail the stated specification is three or more, reject the instrument for consistent relationship.

(ii) If the number of measurements from the series of 7 which fail the stated specification is either one or two conduct a second set of 8 test measurements. If the number of measurements failing the consistent relationship test in the combined total of 15 test measurements is:

(*a*) One or two, pass the instrument for consistent relationship.

(*b*) Three or more reject the instrument for consistent relationship.

(2) (i) Data for 24-hour comparisons shall be collected according to the sampling plan given in § 53.33(c) (Table C–4). Table C–4 shall be used to select either plan 1, 2, or 3 for a sample size of 7 and if an additional sample of 8 is required, then either plan 4, 5, or 6 shall be used.

(ii) Sampling shall be conducted in sets of three ranges as specified in § 53.33(b) (Table C–3) and, within each set, sampling without replacement shall occur. For example, if the first range selected is low, the next one is either medium or high. If the second is high, then the third is either medium or low. When obtaining 1-hour measurements, the data shall be collected consecutively over the high range 0.40–0.50 ppm with no more than four 1-hour measurements in a given 24-hour time period.

(b) TEST SPECIFICATIONS FOR SULFUR DIOXIDE: TABLE C–3

SO_2 range (p.p.m.)	Tolerance, i.e., allowable difference between Cand. and Ref. methods	Number of measurements required			
		24 hour measurement		1 hour measurement	
		1st sample set	2nd sample set	1st sample set	2nd sample set
1. Low 0.02–0.06	±0.02	2	3		
2. Med. 0.10–0.15	±0.03	2	2		
3. High 0.40–0.50	±0.04	3	3	7	8
Total		7	8		
Allowable number of differences which can fail tolerance specification		0	2	0	2

(c) Sampling Plans for SO_2 Test Specifications: Table C–4

For Sample Size of 7:

Plan No. 1	H	L	M	H	M	L	H
Plan No. 2	L	M	H	M	H	L	H
Plan No. 3	M	H	L	H	M	L	H

For Sample Size of 8:

Plan No. 4	M	H	L	H	L	M	L	H
Plan No. 5	H	L	M	L	H	M	H	L
Plan No. 6	L	M	H	M	H	L	H	L

NOTE: L=Low Concentration Range, M=Medium Concentration Range, H=High Concentration Range, as specified in Table C–3 of § 53.33(b).

(d) Manual methods:

(1) Calibration:

(i) Calibrate the reference method in accordance with the procedure specified for the reference method in 40 CFR Part 50.

(ii) The candidate manual method shall be calibrated in accordance with the procedure specified by the manufacturer.

(iii) The calibration data for both the reference and candidate methods and the calibration procedure and calculations for the candidate method shall be submitted.

(iv) A detailed procedural description of the candidate method shall be submitted.

(v) Simultaneous measurements of pollutant concentration by means of reference and candidate methods for the specified concentration ranges and averaging times specified in § 53.33(b) (Table C–3) shall be obtained. Note: Control samples may be used to document the validity of the results. On any given day only one 24-hour test result shall be reported for a specified concentration range. In the range 0.40–0.50 ppm, test results for both 3-hour averaging times and 24-hour averaging times shall be obtained in a given day.

(vi) Section 53.33(b) (Table C–3) delineates the number of measurements needed for each of the SO_2 ranges and their respective tolerances for both 24-hour measurements and 1-hour measurements. Table C–3 indicates that the total sample size for the first sample is 7 and the allowable number of times specifications can be exceeded is 0. Similarly the second sample, if required, is 8 and the allowable number of times specifications can be exceeded for the combined total of both samples (15) is 2.

(2) The acceptance sampling plan necessary to perform the statistical tests is specified as follows:

(i) The first sample set shall consist of an initial set of 7 measurements. The results of these measurements shall be interpreted as follows:

(*a*) If the number of measurements from the 7 which fail the stated specification does not exceed zero, pass the instrument for consistent relationship.

(*b*) If the number of measurements from the 7 which fail the stated specification is three or more, reject the instrument for consistent relationship.

(ii) If the number of measurements from the 7 which fail the stated specification is either one or two conduct a second set of 8 test measurements. If the number of measurements failing the consistent relationship test in the combined total of 15 test measurements is:

(*a*) One or two, pass the instrument for consistent relationship.

(*b*) Three or more, reject the instrument for consistent relationship.

(3) Data for 24-hour comparisons shall be collected according to the sampling plan given in § 53.33(c) (Table C–4). Sampling shall be conducted in sets of four ranges as specified in § 53.33(b) (Table C–3) and, within each set, sampling without replacement shall occur. For example, if the first range selected is low, the next one is either medium, high or very high. When obtaining 3-hour measurements, the data are collected consecutively over the high range 0.40–0.50 with no more than four 3-hour measurements in a given 24-hour period.

[FR Doc.73–21342 Filed 10–11–73;8:45 am]